

15 December 2016

**NSW Planning Assessment Commission Determination Report  
Airly Mine Extension Project (SSD 5581)**

## **1. INTRODUCTION**

On 29 September 2016, the Planning Assessment Commission (Commission) received from the Department of Planning and Environment (Department) a State significant development application from Centennial Airly Pty Ltd (Applicant) for the Airly Mine Extension Project.

The Department has referred the development application to the Commission for determination in accordance with the Minister for Planning's delegation dated 14 September 2011 because it received more than 25 public submissions in the nature of objections.

The Department's referral follows the Commission's public hearing on 23 September 2015 and review report (Review) dated November 2015.

Ms Lynelle Briggs AO, Chair of the Commission, nominated Ms Robyn Kruk AM (chair), Dr Maurice Evans, and Mr David Johnson to constitute the Commission to determine the development application.

### **1.1 Summary of the development application**

The development application seeks consent to extend underground mining at the Airly coal mine for an additional 25 years – including 20 years of mining and five years of post-mining decommissioning and rehabilitation. The area of mining would extend east from the current mining lease (ML 1331) into an exploration licence area (Authorisation Area 232), subject to approval from the Minister for Industry, Resources and Energy. The project would involve:

- continued bord and pillar mining in the Lithgow seam with the existing maximum rate of extraction of 1.8 million tonnes per year of run-of-mine coal;
- a new coal preparation plant, coal stockpile and reject emplacement area; and
- upgrades to other existing infrastructure and facilities where necessary;

A detailed description of the development application is in Table 1 of the Commission's Review.

### **1.2 Public hearing and Review**

On 13 August 2015, the Minister for Planning requested the Commission to conduct a public hearing and review the merits of the project. In summary, the Minister's terms of reference (see **Appendix 1**) requested the Commission to consider:

- the Applicant's environmental impact statement, public and agency submissions, the Applicant's response to submissions and other information;
- the merits of the project as a whole, having regard to all relevant policies;
- subsidence impacts on the natural values of the Mugii Murum-Ban State Conservation Area;
- water impacts, including downstream water impacts in the Gardens of Stone National Park;
- social and economic impacts; and
- if necessary, additional measures to avoid, minimise or manage potential impacts.

The Commission subsequently held a public hearing on 23 September 2015 in Lithgow, invited submissions, visited the site and surrounds, and met with the Applicant, the Department, Lithgow City Council, Division of Resources and Energy (DRE) and the Environment Protection Authority (EPA).

The Commission published its *Airly Mine Extension Project Review Report* in November 2015 and made nine recommendations in relation to subsidence, water resources and visual impacts (see **Appendix 2**). One of the most significant recommendations was that an independent expert panel should be convened, prior to determination, to provide advice on the accuracy and reliability of predicted subsidence impacts, and the adequacy of subsidence management as recommended in the draft conditions of consent.

### **1.3 Statutory consideration of the Commission's Review**

Before determining the application, the Commission considered the findings and recommendations of the Commission's November 2015 Review as required by section 80(7) of the *Environmental Planning and Assessment Act 1979*.

### **1.4 Independent expert panel (subsidence)**

In response to the Commission's recommendations, the Department formed an independent expert panel in March 2016, in consultation with the DRE. Three recognised subsidence experts were appointed – Dr Ken Mills (SCT Operations Pty Ltd), Prof. Ismet Canbulat (UNSW Mining Engineering), and Mr Don Kay (MSEC Pty Ltd).

The independent expert panel delivered its report on 1 July 2016 entitled *Report of the Independent Review Panel on Accuracy and Reliability of Mine Subsidence Impacts on Sensitive Features Across the Airly Mine Extension Project Application Area*.

The independent expert panel's advice is discussed in Section 5.1 of this report.

## **2 THE DEPARTMENT'S ASSESSMENT REPORTS**

The Department completed its preliminary assessment report on 14 August 2015 and final assessment report on 29 September 2016. The final assessment report responded to each of the Commission's recommendations and the independent expert panel's advice. The Department's assessment concluded overall that:

- the proposed mining systems are conservative and designed to avoid significant subsidence;
- impacts on biodiversity, water resources and other environmental matters are minor. Any residual impacts would be managed under the conditions of consent and no offsets or property acquisitions are required;
- the recommended conditions of consent would provide a comprehensive, strict and precautionary approach to ensuring the project complies with performance standards;
- any potential reduction in flow from the Village Spring would be an acceptable impact on the recreational values of the state conservation area; and
- the proposal is a logical continuation of an existing consent and would provide continued economic and social benefits for the Lithgow region and New South Wales.

## **3 COMMISSION'S MEETINGS FOR THE DETERMINATION**

In October 2016, as part of the consideration of the proposal for determination, the Commission met with the Department, visited the site with the Applicant, met with Lithgow City Council and conducted a public meeting in Lithgow. Notes from these meetings are provided in **Appendices 3, 4 and 5**.

### **3.1 Briefing from the Department of Planning and Environment**

The Department briefed the Commission on its final assessment report on 6 October 2016. The Department explained its response to the Commission's recommendations, the independent expert panel's report and outlined the recommended strengthened conditions of consent.

The Commission met with the Department again on 4 November 2016 after receiving written and oral submissions at the public meeting. The Department briefed the Commission on the recommended conditions for water monitoring, licensing and compensation, the arrangements for the independent expert panel, and the proposed regime and performance criteria for adaptive management. The Department emphasised the significant benefits of the independent expert panel now being established by and reporting to the Secretary of the Department, instead of the Applicant.

### **3.2 Briefing from Centennial Airly Pty Ltd**

The Applicant briefed the Commission on its response to the Commission's November 2015 Review on 27 October 2016. The Applicant explained the mine design and subsidence monitoring techniques that may be suitable to respond to the recommendations of the independent expert panel.

### **3.3 Meeting with Lithgow City Council**

The Commission met with Council on 28 October 2016 where Council acknowledged the significant on-going public socio-economic benefits of the proposed mine extension and indicated its support for the project and the long-term potential economic benefits to the area.

### **3.4 Public meeting**

The Commission held a public meeting at the Lithgow and District Workmen's Club on 27 October 2016. A list of the speakers that presented to the Commission is provided in **Appendix 4**. A summary of the issues raised by the speakers orally and in written submissions from the community is provided in **Appendix 5**.

## **4 ADDITIONAL INFORMATION**

Following the public meeting, the Commission requested and received:

- the Applicant's *Gap Creek and Genowlan Creek Flow Investigation* prepared by GHD Pty Ltd, dated 20 October 2016;
- a written response from the Department dated 16 November 2016 about a number of matters including the role of State agencies and the independent expert panel in post approval matters, and the proportionality of measures in the recommended conditions to the predicted environmental risks.

These additional items are attached in **Appendix 6** and **Appendix 7**, respectively.

## **5 COMMISSION'S CONSIDERATION**

In this determination, the Commission has carefully considered:

- all information provided to the Commission by the Department;
- the Department's preliminary and final assessment reports;
- advice from the independent expert panel and State agencies;
- all oral and written submissions from the public and special interest groups;
- additional information provided to the Commission as described above in Section 4; and
- section 79C of the *Environmental Planning and Assessment Act 1979*.

The Commission acknowledges that the written and verbal submissions received by the Commission prior to, at and after the public meeting were particularly focused on the potential impacts of subsidence on geodiversity, water resources and biodiversity of the mesas and in the wider area, including the consequent impacts on tourism.

### **5.1 Subsidence and geodiversity**

The existing mine and the proposed mine extension are situated in an area of spectacular geodiversity with majestic cliffs and rock formations that are considered highly significant and delight the local

community and visitors alike. The potential subsidence effects of mining must be very carefully examined in order to ensure that potential subsidence impacts do not lead to a deterioration in these natural values.

In the Review, the Commission acknowledged that bord and pillar mining would be a conservative approach to coal recovery that could achieve very low levels of subsidence and minimal subsidence impacts. However, the Commission challenged and required confirmation of the Applicant's assurances in the mine plan that it would be able to meet the predicted subsidence performance.

Consequently, the Commission made a number of recommendations, most significantly that the independent expert panel should be convened prior to determination to give advice on the accuracy and reliability of the Applicant's subsidence predictions. In addition, the Commission recommended:

- preparation of a time line showing the progression of coal extraction (see **Appendix 8**);
- any conditions of consent expressly require the independent expert panel to be consulted in preparing, revising and enforcing the extraction plans and associated management plans including the water management plan, biodiversity management plan and land management plan, particularly in relation to relevant mine design principles, trigger action response plans and performance indicators; and
- all advice from the independent expert panel to be made publicly available.

The Commission has considered the independent expert panel's report. While noting that rock fall is a natural process, which cannot be fully prevented, the independent expert panel concluded overall:

- the proposed mining methods are relatively conservative. They can be expected to maintain surface movements at low levels and have potential to avoid significant impacts and minimise residual impacts on cliffs, steep slopes and pagodas;
- the proposed pillar specifications have a high probability of remaining long-term stable under predicted loads. A program of further analysis at extraction plan stage should indicate whether revised pillar specifications are necessary under steeply dipping terrain;
- protection zones on either side of cliff lines are expected to be effective in protecting sensitive cliff formations. Particular attention should be given to cliff stability on a case by case basis where protection-zone pinch points occur (i.e. where mining and cliff geometry result in minimum width protection zones);
- a larger protection zone should be considered in the vicinity of the New Hartley shale mine where protection from rock fall is required; and
- adaptive subsidence management is not effective where impacts occur too quickly or too slowly for an effective response. Initial monitoring of subsidence in areas with less sensitive landform features should be carried out to calibrate high confidence monitoring systems, validate subsidence predictions, and if necessary adjust mine specifications, before mining under any sensitive landform features.

The Commission notes the independent expert panel's advice was based on clear mine design specifications, and the independent expert panel's own pillar stability assessment. The specifications, which include protection zones for sensitive landform features, are now referred to in the Department's recommended conditions of consent and must be addressed in the extraction plans.

Significantly, the independent expert panel advised that adaptive management of subsidence impacts would not be effective where impacts occur too quickly (or too slowly) to make adaptations to the mine plan. While the independent expert panel observed that the overall subsidence parameters are plausible – being 125mm vertical subsidence with fairly narrow angles of draw – sensitive landform features must not be approached without first establishing a highly accurate picture of actual subsidence in areas of less sensitive landform features. This is to say that, any adaptations to mining

necessary to protect sensitive landform features must be made before mining under sensitive landforms – and not while mining under sensitive landforms.

The independent expert panel also observed that the low levels of subsidence approach the tolerance limits of many subsidence monitoring methods. It may be difficult to verify subsidence performance, especially in rough terrain where physical access is restricted. The independent expert panel advised that a high confidence subsidence monitoring method using both conventional and advanced technology be trialled and calibrated to assist in the adaptation of mine methods for sensitive landforms.

The Department has revised the recommended conditions in response to the independent expert panel's advice and proposed precautionary safeguards that provide a higher than usual level of oversight of the mine's progression. In addition to the requirement to obtain extraction plan approval for first workings beneath cliff lines, the Applicant must now complete mining in four panels under less sensitive landforms in order to obtain enough subsidence data to make any necessary mine adaptations before proceeding to mine under more sensitive landforms.

The Department has also established a significantly revised role for the independent expert panel. While the recommended conditions provide for the reasonable costs of the independent expert panel to be reimbursed to the Department by the Applicant, the independent expert panel would be directly established by, and report to, the Secretary of the Department. This ensures the independent expert panel is separate from the Applicant's interests, and also ensures the independent expert panel's advice becomes and remains public information. This accords to the Commission's November 2015 Review recommendations.

The Commission has further revised the Department's recommended conditions of consent to ensure the Applicant is explicitly required to consult the independent expert panel in the preparation of an extraction plan for each phase of mining – including the preparation of an extraction plan for first workings in the vicinity of cliff lines – which includes preparation of the associated subsidence monitoring, water management, biodiversity and other management plans. This revision is to ensure the conditions of consent better accord with the Commission's Review recommendations. As an independent expert panel has already been established by the Department in accord with the Commission's November 2015 Review, it is no longer necessary to include a condition of consent establishing the panel (Condition 5, Schedule 3). The role of the independent panel has been embedded in the relevant consent conditions. The Secretary of the Department is able to set any specific terms of reference for the independent expert panel that may be necessary for each engagement.

### *Conclusion*

The Commission made a number of findings about subsidence in the November 2015 Review. While the proposal allows access to an important coal resource, modern longwall mining methods (and impacts) were considered to be vastly incompatible with the sensitive landform features of the state conservation area in which the mine occurs. Instead, the Applicant proposed more conservative, traditional mining methods, which reduce the overall efficiency of the mine, but avoid the potential subsidence and subsidence impacts of more aggressive modern mining methods.

However, in conducting the Review, the Commission challenged and sought additional assurances about the precision and reliability of the subsidence predictions as originally presented by the Applicant. Confidence in the predictions was, and remains, significant to the local community.

The Commission accepts the advice and recommendations provided by the independent expert panel in its report of 1 July 2016. While the Commission notes that adaptive management for mining that is underway would not respond to subsidence impacts as they were occurring, the system of adaptive management in the conditions of consent represents a more cautious, iterative approach. It involves careful monitoring of subsidence in areas with less sensitive landforms, with the feedback of monitoring data and advice from the independent expert panel into the mine design parameters until the appropriate subsidence performance can be demonstrated, before mining toward more sensitive landforms. The Commission notes this iterative approach to adaptive management will be a specific additional safeguard in the conditions of consent, which responds to the concerns expressed by the Commission in the November 2015 Review.

The Commission concurs with the extensive subsidence performance criteria in the recommended conditions of consent. These require protection zones and/or certain levels of protection for particular surface features such as Gap Creek, Genowlan Creek, the Grotto, cliffs, pagodas and threatened species. The Commission recognises that the recommended conditions reflect the Department's comprehensive framework for assessing and managing subsidence impacts for underground mines across the state.

The Commission also concurs with the substantial revision to the reporting arrangements for the independent expert panel, where the panel would be established by and report to the Secretary of the Department, who may also engage, at the Applicant's expense, any other expert to assist with the appraisal of mine designs, management plans, and monitoring data. These changes accord with the Commission's November 2015 Review.

Overall, the Commission is satisfied that by obtaining advice from the independent expert panel prior to determination, and giving a more extensive consultation role to the independent expert panel for the Applicant's preparation of extraction plans and associated management plans, an appropriate level of confidence can be achieved for the prediction, minimisation and management of subsidence and subsidence impacts across the project area.

## **5.2 Water resources**

As part of the Review, the Commission received preliminary advice from the EPA that surface water discharges could be managed to achieve 99% species protection in the Gardens of Stone and Wollemi national parks. The Commission recommended the Department consult further with the EPA to confirm any conditions of consent that may be necessary to facilitate this management. While surface water discharges continue to be of concern to the community, as raised at the public meeting and in written submissions, the Commission notes the EPA has confirmed it is satisfied with the Department's recommended conditions. The conditions include a requirement to obtain two years of data relating to water flows and quality in Airly Creek to assist the EPA to nominate site specific discharge values in the Applicant's revised and updated Environmental Protection Licence.

The Commission made two further recommendations to strengthen the conditions of consent for compensating loss of private and public surface water, if any, resulting from subsidence in the vicinity of Gap Creek, Genowlan Creek and the Village Spring. In recommending stronger water compensation conditions, the Commission acknowledged the substantial amount of work undertaken on potential water resource impacts of the project, particularly in response to agencies and public submissions. This work included a review by the Commonwealth Independent Expert Scientific Committee, an independent review by Dr Noel Merrick, preparation of additional information by the Applicant, and an assessment by the Department of Primary Industries (Office of Water).

The Commission accepted advice from the various authorities that there was sufficient data to prepare the groundwater impact assessment and that the groundwater model was adequate for an assessment of the project under the State government's aquifer interference policy. The Commission noted in particular that the Department of Primary Industries recommended conditions of consent for a comprehensive groundwater monitoring and management plan in order to calibrate the groundwater model and inform subsequent mining parameters in the extraction plan applications. These conditions have been incorporated into the Department's recommended conditions.

Concern for the loss of water resources from both within the mesa complex and more broadly in the district was also a prominent issue for speakers at the public meeting. Specific issues raised at the public meeting included:

- agriculture in the district is heavily reliant on groundwater resources and depressurisation of the productive aquifers would be very difficult to compensate;
- water compensation should be considered for public and environmental purposes;
- the groundwater model and other water information is not sufficiently detailed to determine the extent of water compensation that may be required; and
- the community had perceived a loss of surface flow in Gap Creek since mining commenced.

The Department responded to the Commission's recommendations in the final assessment report, and provided additional information to assist the Commission's consideration of the issues raised at the public meeting (see **Appendix 7**). The Applicant has also provided a recent water monitoring report for Gap Creek (see **Appendix 6**) showing no material change in the creek's flow regime between October 2013 and April 2016, although the evaluation of this report is a compliance matter for the Department under the existing consent.

The Department's final assessment report included revised water compensation conditions for private landholders in accordance with the Review recommendations. The recommended conditions include specific consideration for surface water losses related to subsidence in the vicinity of Gap Creek and Genowlan Creek. This accords with the Commission's recommendation. The Department has not recommended conditions for a compensatory supply at the Village Spring. Among other reasons, the Department referred to advice from the National Parks and Wildlife Service, which indicated why this would be impractical and unnecessary, having regard to the statutory plan of management.

The Commission notes the extensive regulatory oversight and on-going involvement of the independent expert panel, DRE, Department of Primary Industries and the EPA in the preparation and approval of individual extraction plans as mining progresses, the development of surface and groundwater criteria, trigger thresholds, and development of high accuracy subsidence monitoring methods.

In response to the Commission's query about the extent to which recommended conditions are proportional to the risks of water resource impacts, the Department responded (see **Appendix 7**):

"The Department notes that the relative risk of impacts from the mine are considered to be low given the small scale of mining and the nature of bord and pillar mining. Nevertheless, the Department has adopted a very conservative approach in its recommended conditions for this project in order to address key community concerns.

In particular, the conditions that would regulate surface water, ground water and biodiversity impacts of the mine are not necessarily proportional to the level of risk of impacts. For example, while there is a negligible risk that mining would affect landholders' water supplies, the Department has included its standard condition requiring compensatory water supply."

### *Conclusion*

The Commission made a number of findings in respect of potential water resource impacts in the Review. The Commission continues to accept expert advice that the physical aspects of the geology in which the mine would occur limit the extent of water related impacts.

The Commission accepts that the productive groundwater resources in the Shoalhaven and underlying Devonian geological groups are below the level of the mine and are highly unlikely to be materially affected by mining. These resources supply the registered bores in the Capertee Valley. The mine's production bore draws water from the Shoalhaven group. It, along with predicted mine inflows, is licenced under the water sharing scheme with sufficient capacity for the mine's needs.

The Commission also accepts that the groundwater resources within and above the mine are less productive. They are unsaturated aquifers in fractured, hard rock geology. The Applicant's groundwater model is adequate for the assessment of the development application, and will be calibrated with more comprehensive monitoring data as part of the post consent, extraction plan application process. This is an acceptable approach under the State government's aquifer interference policy, which permits a risk based approach that is proportional to the likelihood and severity of impacts. In this case, the overall magnitude of potential impacts is limited because the ground water resource is not highly productive, and contributes a small volume of water to the catchment. The predicted impacts, known as 'Level 1' impacts, are acceptable under the State government's policy.

Due to the sensitive natural and recreational values of the mesas, and the community concerns about the loss of water resources for downstream users, the Department has recommended a precautionary approach to water management, in accordance with the Review recommendations. The Department's recommended conditions include water flow and discharge parameters, water compensation in the unlikely event that compensation is required, and independent evaluation of the water management at the mine. The Commission considers these requirements sufficiently cater to the sensitivity of the area and the community's concerns.

Following further advice from the National Parks and Wildlife Service, the Commission is persuaded to reconsider the Review recommendations in respect of providing a compensatory water supply at the Village Spring. The statutory management plan for the area promotes the area as a destination for self-reliant recreation and the likely number of visitors would not warrant the infrastructure and ongoing maintenance required to ensure a continuous potable supply.

### **5.3 Biodiversity**

The Commission concluded in the Review that the Department's assessment of potential impacts to threatened species and endangered ecological communities (EEC) was generally satisfactory. The Commission noted that the seven-part test had considered maximum impact scenarios and found the risk of impacts to be low. The recommended conditions specify subsidence performance of 'negligible environmental consequences' to threatened species or EECs, and 'no environmental consequences' to the Genowlan Point *Pultenaea* sp. and *Allocasurina nana* heathland. A biodiversity management plan must be prepared, although biodiversity offsets are not required, and this outcome has been agreed to by the Office of Environment and Heritage (OEH).

A number of speakers at the public meeting and written submissions expressed concerns regarding the completeness of the Commission's findings on biodiversity impacts. For example, a concern that the potential impacts of subsidence and a range of issues previously raised by Birdlife Australia and others, particularly in relation to the Regent Honeyeater, had not been fully addressed.



The Commission confirms that all such issues had been given detailed attention in the Applicant's earlier response to submissions report, which formed an essential consideration for both the Department's assessment and the Commission's Review. Considerations relevant to these issues are:

- vegetation is unlikely to be affected by low levels of subsidence and drawdown over most of the site. There is no groundwater dependent vegetation. The species that occur within shallow alluvial aquifers are known to persist in the absence of groundwater;
- subsidence above workings in the former shale mine may impact root zones, but these impacts would not be extensive, and individual trees are likely to recover;
- mining is restricted to first workings under cliffs to minimise the occurrence of induced rock fall, and therefore minimise impacts to species that are vulnerable to rock fall;
- Box-Gum Woodland EEC in the reject emplacement area (REA 2) is unlikely to occur more widely than mapped because of the less fertile soil conditions away from drainage lines;
- the loss of a number of isolated trees and tree hollows, and minor additional fragmentation is not expected to result in significant biodiversity impacts; and
- the whole project area was assessed to be potential habitat for the Regent Honeyeater. Some areas were assessed to be more suitable, while other less so. It would not be correct to regard all vegetation communities as 'critical habitat'.

The Commission's satisfaction in this regard is reinforced by both the OEH and the Commonwealth Department of the Environment and Energy being satisfied that the Department's recommended conditions provide an appropriate level of protection for both State and national biodiversity matters. The Commission notes that, the extraction plan condition specifically mentions the *Pultenea* and the *Allocasurina* heathland, among other species, to ensure potential biodiversity impacts from the mine design are no greater than provided for in the recommended conditions of consent for subsidence performance.

#### **5.4 Visual impacts**

As part of a visit to the mine site and surrounds for the Review, the Commission observed the potential visual impacts of the proposed new surface infrastructure and recommended stronger conditions of consent for visual mitigation measures be imposed, requiring landscape planting before any construction work begins.

Potential adverse visual impacts continue to be of concern to the community. Speakers at the meeting requested more attention be given to landscape plans – noting that basal landscaping around the reject emplacement area may be insufficient – and observed that parts of the existing mining operation can already be seen from the road.

The Department's revised recommended conditions includes a new condition, which requires tree planting around the emplacement area three months before construction begins. This accords with the Commission's earlier recommendation.

While some tree planting has occurred under an earlier modification to the existing consent, the Commission considered that more attention to visual amenity and tree planting by the Applicant should be encouraged as part of its ordinary, non-statutory social responsibilities. The Commission has added a further condition requiring the Applicant to establish additional tree planting in the road reserve of the Castlereagh Highway in locations where the emplacement area may be visible, in consultation with the relevant road authority. This should include locations such as A16 in the Applicant's visual impact assessment.

## **5.5 Other issues**

All other issues raised in submissions have been adequately addressed in the Applicant's response to submissions report, the Department's preliminary and final assessment reports, and in the recommended conditions of consent.

The Commission is satisfied that the project will have significant social and economic benefits for the Lithgow community and the state, including the employment of 135 employees under full operating conditions.

The Commission is satisfied that the risk of potential impacts to Aboriginal heritage sites is negligible, subject to the implementation of the mitigation measures outlined in the cultural heritage management plan, including fencing and erosion and sediment controls.

The EPA has advised that the noise, vibration and air quality assessments have been undertaken in accordance with the applicable government policies. The Commission is satisfied that the project would not result in exceedances of noise, vibration or air quality criteria at any receiver.

The Commission is satisfied that the Applicant's decommission and rehabilitation strategy is suitably comprehensive and would return the land to an acceptable post-mining land use. This would be secured through rehabilitation objectives and a rehabilitation management plan required under the conditions of consent.

## **6 COMMISSION'S FINDINGS AND DETERMINATION**

The Commission has carefully considered the findings and recommendations of the November 2015 Review, the Applicant's proposal and response to the Commission's November 2015 Review, the Department's preliminary and final assessment reports and the relevant matters for consideration under section 79C of the *Environmental Planning and Assessment Act 1979*. The Commission has carefully considered the advice and recommendations from the independent expert panel and relevant government agencies. The Commission has also carefully considered written oral submissions from the community.

The Commission accepts the advice of the independent expert panel about the likelihood and risk of subsidence and the management of residual uncertainty for sensitive landform features. The advice has been carefully considered by the Department in the final assessment report, and it is adequately represented as an iterative approach to adaptive management in the recommended conditions of consent. As an independent expert panel has already been established by the Department in accord with the Commission's November 2015 Review, it is no longer necessary to include a condition of consent establishing the panel (Condition 5, Schedule 3). The Commission has embedded the role of the independent panel in the relevant consent conditions. The Secretary of the Department is able to set any specific terms of reference for the independent expert panel that may be necessary for each engagement.

The Commission is satisfied that the water resource impacts of the proposed mine extension have been adequately assessed. The groundwater model is adequate for assessment purposes, and will be calibrated with comprehensive monitoring data as part of the extraction plan application process. This is an acceptable approach in the present circumstances, where groundwater impacts are expected to be limited because of the limited productivity of the aquifers overlaying the mine plan. Even though the overall water impacts are expected to be negligible, the Department has recommended a precautionary approach to water management and private compensation with a comprehensive management framework in the recommended consent conditions, in accordance with the Commission's Review, in order to provide an additional assurance to the community. The Commission

accepts the further advice from the National Parks and Wildlife Service that a compensatory water supply at the Village Spring is impractical and unnecessary.

The Commission is satisfied that the community concerns relating to biodiversity assessment and potential impacts have been addressed by the Applicant. There is no requirement for a biodiversity offset and there are appropriate performance and management specifications in the recommended conditions of consent. The Department's recommended consent condition requiring landscaping around the reject emplacement area ahead of the construction schedule accords with the Commission's Review recommendation. The Commission has included an additional condition requiring the Applicant to establish more distant landscaping to shield the site from the Castlereagh Highway, in consultation with the relevant road authority.

Finally, the Commission is satisfied that the Department's preliminary and final assessment reports and recommended conditions adequately address and provide an appropriate framework for the management of residual impacts that might be expected as the mine progresses and finally closes. In addition, approval of the mine would secure socio-economic benefits for the Lithgow region and provide for the continued employment of local people.

For the reasons set out above, the Commission accepts the Department's recommendation that State significant development application 5581 be approved subject to conditions recommended, with the Commission's revisions as described in this report. Consequently, the Commission has determined to grant consent to the proposal subject to the conditions set out in the instrument of approval.



**Ms Robyn Kruk AM**  
**Member of the Commission**  
**Commission**



**Dr Maurice Evans**  
**Member of the Commission**



**Mr David Johnson**  
**Member of the**

## APPENDIX 1


### MINISTER FOR PLANNING'S TERMS OF REFERENCE FOR THE COMMISSION'S REVIEW

#### **Request to the Planning Assessment Commission Airly Mine Extension Project**

Section 23D of the *Environmental Planning and Assessment Act 1979*  
Clauses 268R and 268V of the *Environmental Planning & Assessment Regulation 2000*

I, the Minister for Planning, request the Planning Assessment Commission to:

1. Carry out a review of the Airly Mine Extension Project, and:
  - a) consider the environmental impact statement for the project, the issues raised in submissions, the Commonwealth Independent Expert Scientific Committee's advice, the additional information and response to submissions provided by Centennial Coal, the Department of Planning and Environment's preliminary environmental assessment report, and any other relevant information provided on the project during the review;
  - b) assess the merits of the project as a whole having regard to all relevant NSW Government policies, and paying particular attention to its potential:
    - o subsidence impacts on the natural values of the Mugii Murum-ban State Conservation Area, including cliff lines, steep slopes, pagodas and gorges, and any threatened species or endangered ecological communities;
    - o water impacts, including any downstream water quality impacts in the Gardens of Stone National Park; and
    - o social and economic impacts; and if necessary,
  - c) recommend further measures to avoid, minimise, and/or manage the potential impacts of the project.
2. Conduct public hearings during the review.
3. Submit its final report on the review to the Department of Planning and Environment within 10 weeks of receiving the Department's preliminary environmental assessment of the project, unless the Secretary of the Department of Planning and Environment agrees otherwise.



**The Hon Rob Stokes MP  
Minister for Planning**

Sydney *13th August* 2015

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**APPENDIX 2**  
**COMMISSION'S NOVEMBER 2015 REVIEW RECOMMENDATIONS**

**Subsidence**

1. That the Department requires the Applicant to provide a proposed timeline of coal extraction, including a plan showing the expected progression of mining over the 25 year project life.
2. That the proposed condition of consent that establishes the Panel of suitably qualified experts should specify that the Panel will be constituted by suitably qualified, experienced and independent experts (i.e. an Independent Expert Panel) whose appointment has been approved by DRE. Clarify in Report how this has changed.
3. That the Independent Expert Panel should be established prior to determination, and undertake the following:
  - review all submitted material on subsidence, including additional information supplied by the Applicant and its consultant, and comments from DRE and its Principal Subsidence Engineer;
  - provide advice and recommendations about the following:
    - the accuracy and reliability of predicted subsidence impacts on sensitive landform features, particularly in relation to cliff lines in the vicinity of the areas to be mined beneath the former New Hartley Shale Mine;
    - the adequacy of the management regime in the proposed conditions of consent, including the performance criteria, management plans and monitoring requirements, in terms of providing appropriate protection to sensitive landform features.
4. That the proposed condition for the Extraction Plan expressly requires consultation with the Independent Expert Panel in preparing, revising and enforcing the Extraction Plans and associated management plans (including the Water Management Plan, Biodiversity Management Plan and Land Management Plan), particularly in relation to relevant mine design principles, the development of detailed Trigger Action Response Plans and performance indicators.
5. That all information relevant to the Independent Expert Panel's advice and recommendations is made publicly available on the Applicant's website.

**Water Resources**

6. That, prior to determination, the Department seeks written confirmation from EPA that any residual issues relating to water discharges into Airly Creek and any downstream water quality impacts in the Gardens of Stone National Park can be adequately resolved, particularly in relation to the achievement of 99% species protection.
7. That the recommended condition of consent relating to the Water Management Plan should be strengthened to include specific consideration of the potential impacts to downstream water users of subsidence-related flow reductions in Gap Creek and Genowlan Creek, and the measures to implement the provision of compensatory water supply.
8. That the Department should include a condition of consent requiring that the Applicant provides an alternative, artificial water source to the Village Spring to ensure that bushwalkers and hikers have access to drinking water.

**Visual Impacts**

9. That the proposed conditions of consent relating to visual mitigation measures are strengthened to ensure that vegetation screening or other mitigation measures commence before any construction occurs and are implemented in a timely manner.

**APPENDIX 3**  
**RECORDS OF COMMISSION MEETINGS FOR THE DETERMINATION PROCESS**

**Notes from Briefing from the Department of Planning and Environment**

This meeting is part of the determination process.	
<b>Date:</b> Thursday, 6 October 2016	<b>Time:</b> 3:30pm
<b>Project:</b> Airly Mine Extension Project	
<b>Meeting place:</b> PAC Office	
<b>Attendees:</b> PAC Members: Robyn Kruk AM (Chair); Maurice Evans and David Johnson. PAC Secretariat: David Mooney (Team Leader) and Jorge Van Den Brande (Planning Officer)	
<b>The Department of Planning and Environment (the Department):</b> David Kitto (Executive Director Resource Assessments & Business Systems) Clay Preshaw (Acting Director Resource Assessments)	
The purpose of the meeting was for the Department to brief the Commission on its final assessment report and respond to matters raised by the Commission in the provided agenda.	
The Department briefed the Commission on the following matters: <ul style="list-style-type: none"> <li>• Draft subsidence conditions, the independent expert panel and the UNSW subsidence model. <ul style="list-style-type: none"> <li>- The recommendations on subsidence made by the panel have been incorporated into the recommended conditions.</li> <li>- The DRE is satisfied with the panel's findings and noted mine specification from the independent expert panel report now appear in the recommended conditions.</li> <li>- Under the recommended conditions, the panel will now follow the Department's directions if new advice is requested.</li> <li>- The recommended conditions require the Applicant to make all relevant information, including any advice from the panel, publically available.</li> <li>- The UNSW subsidence model is a hybrid between statistical and empirical subsidence prediction methods.</li> </ul> </li> <li>• Mine plan changes. <ul style="list-style-type: none"> <li>- Mine plan changes may result in a minor reduction in coal yield.</li> </ul> </li> <li>• Public Safety Management Plan. <ul style="list-style-type: none"> <li>- The Applicant's Public Safety Management Plan aims to integrate planning and mining safety regulations.</li> </ul> </li> <li>• Water management. <ul style="list-style-type: none"> <li>- Water management has been previously addressed in the Commission's Review process, as per the Office of Water's advice. That office is now satisfied that all matters regarding water management have been adequately addressed.</li> </ul> </li> <li>• Contributions. <ul style="list-style-type: none"> <li>- The Applicant and Council have agreed to a separate regional agreement for contributions.</li> </ul> </li> </ul>	
<b>Documents tabled at meeting:</b> Maps	
<b>Meeting closed at:</b> 5:30pm	

## Notes of Briefing from the Centennial Airly Pty Ltd

This meeting is part of the determination process.	
<b>Date:</b> Thursday, 27 October 2016	<b>Time:</b> 10:00 am
<b>Project:</b> Determination of Airly Mine Extension Project	
<b>Meeting place:</b> Applicant's Site Offices	
<b>Attendees:</b> PAC Members: Robyn Kruk AM (Chair); Maurice Evans and David Johnson. PAC Secretariat: David Mooney, Jorge Van Den Brande  <b>Applicant:</b> James Wearne – Group Approvals Manager Bob Miller – Airly Mine Manager David King – Airly Senior Mining Engineer Peter Corbett – Principal Technical Services Manager Nagindar Singh – Approvals Coordinator	
The purpose of the meeting was for the Applicant to provide comments to the Commission on the Department's final assessment report.	
Applicant briefed the Commission on the following matters: <ul style="list-style-type: none"><li>• Overview of operations in the last 12 months.<ul style="list-style-type: none"><li>- Subsidence monitoring shows that performance is as predicted and in some cases better.</li><li>- There have been no surface water discharges since September 2015 and minimal groundwater has been encountered.</li><li>- There have not been noise and dust exceedances.</li></ul></li><li>• Subsidence monitoring methods.<ul style="list-style-type: none"><li>- There are three remote sensing and calibration surface subsidence monitoring systems being trialed as well as conventional subsidence manufacturers plus pillar stress monitoring.</li></ul></li><li>• Concerns raised by NSW Office of Water have been addressed.<ul style="list-style-type: none"><li>- There are no ground water dependent ecosystems, only facultative ecosystems.</li><li>- No underground water is planned to be taken from the site.</li><li>- If there is a loss of water to downstream users, legal compensatory provisions are in place.</li><li>- The mine does not have ongoing flows of groundwater and site is dry most of the time.</li></ul></li><li>• Principles and techniques of the mine design.<ul style="list-style-type: none"><li>- Mining zones with different extraction methods have been implemented into the mine design.</li><li>- The angle of draw of 26.5 degrees plus 50 metres will be retained around the New Shale Mine.</li><li>- The project will not cause mining induce seismicity and area is not vulnerable to seismic events.</li></ul></li><li>• After split and quartering occurs, no additional spalling is expected beyond conservative predictions that would impact the long term stability of the final pillars. This is supported by a conservative statistical analysis where the mine produces low abutment loads and its final narrow voids are flooded with water.</li><li>• Refreshments were served by the Applicant at the end of the meeting.</li></ul>	
<b>Documents to tabled:</b> NA	
<b>Meeting closed at:</b> 12:00 pm	

## Notes of Briefing from Lithgow City Council

This meeting is part of the determination process.	
<b>Date:</b> Friday, 28 October 2016	<b>Time:</b> 10:00 am
<b>Project:</b> Determination of Airly Mine Extension Project	
<b>Meeting place:</b> Lithgow City Council	
<b>Attendees:</b> PAC Members: Robyn Kruk AM (Chair); Maurice Evans and David Johnson. PAC Secretariat: David Mooney, Jorge Van Den Brande  <b>Applicant:</b> Stephen Lesslie – Mayor Andrew Muir – Acting General Manager Jessica Ramsden – Development Planner	
The purpose of the meeting was for Council to provide their comments to the Commission on the Department's final assessment report.	
Council raised the following matters: <ul style="list-style-type: none"><li>• Council is in support of the project and its potential economic benefits, including the provision of jobs, to the local community.</li><li>• Council is of the view that should the project be approved, the representation of the Community Consultative Committee should be reviewed.</li></ul>	
<b>Documents tabled:</b> NA	
<b>Meeting closed at:</b> 10:30am	



## Notes of second briefing from the Department of Planning and Environment

This meeting is part of the determination process.	
<b>Date:</b> Friday, 4 November 2016	<b>Time:</b> 10:30am
<b>Project:</b> Airly Mine Extension Project	
<b>Meeting place:</b> PAC office	
<b>Attendees:</b> PAC Members: Robyn Kruk AM (Chair); Maurice Evans and David Johnson. PAC Secretariat: David Mooney, Jorge Van Den Brande	
<b>Department:</b> David Kitto – Executive Director Resource Assessments & Business Systems Clay Preshaw - Acting Director Resource Assessments	
The purpose of the meeting is discuss matters raised at the Public Meeting.	
The Department raised the following matters: <ul style="list-style-type: none"><li>• The experience with far field subsidence and swamp impacts from the Springvale mine does not apply to this project.</li><li>• The proposed extraction plan is required to comply with its water licence. The mine currently monitors its water quality and quantity. Monitoring will increase as the project progresses in its phases.</li><li>• In the unlikely event that mine impacts surface water to downstream users, applicable compensatory provisions are in place.</li><li>• The Applicant will only discharge during the wet season and no contamination is permitted at any discharge point. If contamination does occur a procedure is in place under Section 120 of the POEO Act.</li><li>• The independent expert panel is now established by the Department, under the revised recommended conditions.</li><li>• The Department will provide the Commission with further details on the mechanics of the management plan, extraction plan, adaptive management process for groundwater, surface water and subsidence, with particular emphasis on the role of the independent expert panel.</li></ul>	
<b>Documents to be provided:</b> Department to provide further details on groundwater, surface water and subsidence and the independent expert panel.	
<b>Meeting closed at 11:30am</b>	

**APPENDIX 4**  
**LIST OF SPEAKERS**

**Planning Assessment Commission public meeting for the determination of Airly Mine Extension  
Project D433-16 (SSD 5581)**

Date and Time: Thursday 27<sup>th</sup> October 2016, 2:00pm

Place: Lithgow and District Workmens Club, 3-7 Tank Street Lithgow NSW 2790

**List of Speakers:**

1. Peter Corbett - Centennial Coal
2. Stephen Lesslie - Lithgow City Council  
Andrew Muir
3. Neil Gorrell
4. Keith Muir - Colong Foundation for Wilderness
5. Madi Maclean - Blue Mountains Conservation Society
6. Neil Franklin
7. Alex Mateer
8. Rick Kilpatrick
9. Mary Thirlwall
10. John Thirlwall
11. Julie Gibson - Capertee Valley Land Care
12. Dr Haydn Washington - Colo Committee
13. Brett Baker
14. Michael Keats - Bush Explorers
15. Graeme Osborne - CFMEU Mining and Energy Division
16. Alison Barnes (did not attend)
17. Howard Fisher - Westfund Health
18. Mark Hoy - President Lithgow Chamber Of Commerce
19. Coco & Ziggy Dellalibera (withdrawn)
20. Donna Upton
21. Bruce Upton
22. Rob Cluff
23. Terrie Wallace
24. Greg Guest
25. Ian Coleman SC - Capertee Valley Alliance Inc
26. Peter Andrews (late registration, but did not speak)

## **APPENDIX 5**

### **SUMMARY OF ISSUES FROM WRITTEN AND VERBAL SUBMISSIONS TO THE PUBLIC MEETING**

#### **Water**

- Water resources are significant to agriculture in the district, recreation, and bio-diversity on Airly and Genowlan mountains.
- Reduced surface flows in local creeks and reduced water quality in bores have been observed since mine drilling commenced.
- Community has requested independent monitoring of bores and creeks, but this has not occurred.
- The independent (subsidence) review panel should have a wider scope covering water issues.
- Not enough is known about aquifers and the risk of depressurisation and loss of water resources is too important to ignore.
- Far field impacts to water resources – observed at other mines – have not be considered at Airly.
- Surface water infrastructure should include freeboard to prevent discharges during rainfall, and high performance standards for the clean and dirty water management systems.
- The waste emplacement area does not have a containment structure in place and if it should fail, a rapid response strategy should be in place.
- The Environment Protection Licence does not specify all relevant contaminants for mine water discharge. Water quality in surface water storages should be improved.
- Water compensation should cover both private and public resources.
- Disappointed that compensation for the loss of village spring has not been recommended.
- Compensating farmers for lost water would require very many water trucks, which would overwhelm the local road network.
- The Commission has not considered a final water management plan for the mine and may consequently fail its jurisdictional obligations.
- The Commission has not considered the extent of and legal security for water compensation that may be necessary if water resources are impacted.
- The mine is isolated from regionally significant groundwater sources that supply bores and is unlikely to impact them.
- Gap Creek is ephemeral and data shows little change to its flow regime in recent times.

#### **Mine design and subsidence**

- Uncertainty with subsidence performance is too high to risk on the significant mesa geology.
- Doubtful that maximum 125mm subsidence can be achieved. Confirmation is difficult because of survey tolerances.
- Coal extraction should be limited to 50%, mining under heathlands should be limited to first workings, and mining under Genowlan Point should be prohibited.
- Mine planning should adapt to new knowledge and lessons learnt at other mines.
- The independent (subsidence) review panel should not be constrained in applying new knowledge to the existing mine.
- The independent (subsidence) review panel should be allowed to be more effective, post approval.
- Adaptive management cannot prevent sudden subsidence impacts. Stronger performance measures are required for sensitive landform features.
- Mining 'zones' with different mining methods have been designed to avoid impacts on sensitive landform features.
- Pillars have been designed for long term stability.
- Adaptive mine planning can change mine design to maintain approved subsidence performance.
- Extensive pillar and subsidence monitoring is proposed, both conventional and remote.
- Mine induced seismicity is a low risk and the mine is not vulnerable to external seismic events.

- The independent (subsidence) review panel supports the subsidence performance parameters.
- Workplace culture is to meet performance requirements. There is effort on pillar management.
- The mine has small environmental footprint and comprehensive environmental management systems in place.

### **Geo-diversity**

- The significant values of the state conservation area make it eligible for world heritage listing, if it remains undamaged from mining. This is underestimated in the environmental impact statement.
- Subsidence performance measures for significant geological features should be 'nil impact'.
- A number of significant cliff lines have not been considered for protection.

### **Biodiversity**

- Birdlife submission has not been considered:
  - box-gum woodland has not been adequately mapped;
  - subsidence and groundwater drawdown may affect bird habitat;
  - Needle-Leaf Mistletoe – an important Regent Honeyeater resource – is not mentioned.
  - habitat for Regent Honeyeater is under-estimated in the project area.
- Need for stronger adaptive management plans as Mugii-Murum Ban is home to over 300 endangered species of plants.
- Rock fall and groundwater drawdown may affect the Genowlan Point *Pultenea* sp. and heathland.

### **Tourism**

- Livelihoods in the area based on tourism should be considered in the decision.
- Capertee Valley is well suited to eco-tourism with its majestic landscape and bird watching opportunities. Lithgow Council's destination management plan supports nature based tourism. The mine is incompatible with this.
- Visual impacts affect tourism potential. Mining impacts are encroaching by stealth.

### **Socio-economic**

- The mine provides 135 full time positions and 20 contractor positions.
- The project provides job security and brings economic benefits to the Lithgow area, supporting local businesses and helping local mine workers to avoid the need for fly in/fly out employment.
- The mine's tax and royalty obligations are significant.
- Centennial has supported community projects.
- Employment benefits tend not to be local to the Capertee Valley.
- There should be a sinking fund to remediate long term impacts.
- The proposed mine is uneconomic.

### **Noise**

- Concerns in relation to rail noise were raised for homes near the rail line.

### **Visual impacts and rehabilitation**

- Visual impacts require more attention than the proposed basal landscape planting.
- The coal heap continues to be visible from the road.
- Rehabilitation of the site should be undertaken progressively as the mine advances rather than after the mine ends operations.
- Rehabilitation plan does not address a parcel of land owned by the mine and located between the state conservation area and the national park. This area should be planted to link the two areas.
- A rehabilitation plan has been prepared, showing the mine's commitment to the community.
- Infrastructure and lighting designed to minimise visual impacts.

### **General issues**

- Mining companies tend to have a bad reputation for compliance with environmental standards.
- Mining is unsustainable and should be banned in favour of renewable energy.
- Australia has a very high rate of species extinction.
- Australia is doing little to reduce carbon emissions and avoid climate change.
- Coal subsidies would be better offered to renewable energy providers
- Modern social expectations demand good environmental performance.
- Claims about environmental impacts can be exaggerated by those opposed to projects.
- The Federal Government has stated support for the coal industry.
- NSW currently relies on coal power.
- State approval processes take too long.
- State and Federal Governments have failed to ensure protection of the natural environment as economic imperatives always prevail.
- Tourism is a growing industry while coal mining is a shrinking industry.
- Current economic conditions do not support mining.
- NSW Government should promote the local area as a tourist destination and make planning provisions to facilitate tourist facilities.
- Recent job losses in the district have resulted in high unemployment and families leaving, threatening social cohesion.
- Apprentice intake in the area has declined.
- Biodiversity offsets are rarely an appropriate response to biodiversity losses.

## APPENDIX 6

### APPLICANT'S GAP CREEK AND GENOWLAN CREEK MONITORING REPORT



20 October 2016

Sam Price  
Environment and Community Coordinator  
Centennial Airly Pty Limited  
319 Glen Davis Road  
Capertree NSW 2846

Our ref: 22/18481/  
Your ref:

Dear Sam

#### Gap Creek and Genowlan Creek Flow Investigation

Centennial Airly Pty Limited (Centennial Airly) engaged GHD to investigate anecdotal reports of reduction in flow in Gap Creek and Genowlan Creek. Centennial Airly received correspondence from the Capertree Valley Alliance on 23 September 2016 stating that there had been a major reduction in water flow to Gap Creek and Genowlan Creek during the period from July to September 2016. No further information was provided by Capertree Valley Alliance about the location or estimates of flow.

This investigation relates to conditions 14, 20(b) and 37 of development consent DA162/91 (MOD 6) for Airly Mine that relate to adaptive management of potential disturbance of water supply by mining induced subsidence. The results of the investigation indicated that there has been no change in the hydrology of Gap Creek over the last three years.

#### 1 Site description

A comparison of the mine plan and the location of the Gap Creek and Genowlan Creek flow gauges is shown in Figure 4 (attached). The plan shows that mining activities have been undertaken beneath the headwaters of Gap Creek. The Gap Creek gauge is located immediately downstream of the mining activities and it is therefore suitable for monitoring potential changes to hydrology due to mining. The plan also shows that there are no mining activities beneath the headwaters of Genowlan Creek. Therefore, it is unlikely that Genowlan Creek would be affected above its confluence with Gap Creek.

It is understood that both Gap Creek and Genowlan Creek become losing streams in the lower slopes and flats downstream of the gauges. However, as the gauges on both creeks are located high in the headwaters, it is unlikely that substantial natural losses would occur upstream of the gauges. Therefore, the behaviour of the creeks in the lower slopes and flats was not investigated.

It is understood that an increase in moisture content of coal mined in the initial drive adjacent to Gap Creek was observed. This condition diminished as the workings progressed inbye. It is understood that this is typical of Airly workings and this condition has not continued following initial development. Groundwater monitoring below Gap Creek indicates a minor depressurisation of the coal seam and the Marrangaroo Formation during 2016 which indicates that the observed increase in moisture content is from these low yielding fractured and porous rock groundwater sources. These observations would not be consistent with significant seepage from Gap Creek into the underground workings.

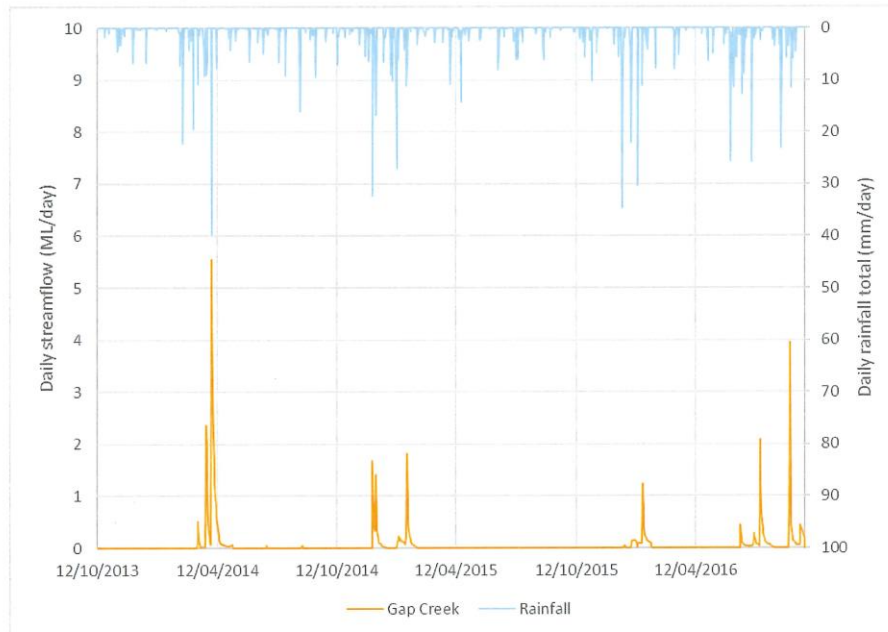
## 2 Available data

The analysis considered observed rainfall and observed streamflow at the Gap Creek gauge since 2013. The source and period of the available data is shown in Table 1.

**Table 1 Available data**

Data	Source	Period
Rainfall	Airly pit top meteorological station	12/10/2013 to 10/10/2016
Gap Creek streamflow	Gap Creek flow gauge	1/2/2013 to 10/10/2016

The available rainfall and streamflow data are shown in Figure 1. The observed flows at the Gap Creek flow gauge exhibits peak flows following rainfall events that recede to no-flow conditions within a few weeks. These properties are characteristic of ephemeral watercourses. By inspection of the magnitude of peak discharge and general shape of the recession limb, it is evident that the hydrograph of flows for July 2016 to September 2016 is consistent with the other flow events since October 2013. This consistency indicates that there has been no change to the hydrology of Gap Creek over the last three years and therefore it is unlikely the streamflow in Gap Creek has been affected by mining.



**Figure 1 Available rainfall and streamflow data**

### 3 Additional analysis of flow in Gap Creek

The streamflow record at the Gap Creek gauge was analysed further and quantitatively compared to observed rainfall. The observed streamflow in Gap Creek since October 2013 were grouped in four distinct events separated by at least one month of no flow. The peak flow, duration, average rainfall and average streamflow for each event are shown in Table 2. The average rainfall included the rainfall in the 30 days preceding the flow period, in order to account for antecedent soil moisture. Note that the period from 20 June 2016 to 29 September 2016 was grouped into one period as the two periods of flow were only separated by two weeks of no flow conditions.

**Table 2** Recent flow periods in Gap Creek

Event	Period	Peak flow (ML/day)	Flow duration (days)	Average rainfall (mm/day)	Average streamflow (ML/day)
1	4/3/2014 to 8/5/2014	5.5	65	1.9	0.33
2	5/12/2014 to 13/2/2015	1.8	70	2.4	0.14
3	24/12/2015 to 6/2/2016	1.2	44	1.9	0.08
4	20/6/2016 to 25/9/2016	4.0	78	1.4	0.15

The most recent flow event (event 4) included the second highest recorded flow since October 2013 and had the longest duration of flow. It also had the second highest average streamflow despite having the lowest average rainfall. This is not consistent with anecdotal reports of recent flows in Gap Creek being disproportionately low compared to rainfall over the same period.

Additionally, the distribution of daily streamflow during the four periods is shown Figure 2. Again, the recent event (event 4) is consistent with the three other events since October 2013. This further indicates that there has been no change to the hydrology of Gap Creek since 2013.

If streamflow in Gap Creek was being lost from the surface flow, it would be expected that the trend for event 4 shown in Figure 2 would shift to the left, that is, less lower flows on the falling limb after a significant rainfall event. This is further illustrated in Figure 3, which shows the distribution of recession rates for the four flow events. The recession rate is the ratio between the flow on a certain day and the flow on the previous day, excluding days on which flow increases or is zero. Again, if water from Gap Creek was being lost, it would be expected that the trend for event 4 shown in Figure 3 would shift to left. In fact, the distribution of recessions rates is consistent for all four recent flow events. This further indicates that there has been no change to the hydrology of Gap Creek since 2013.



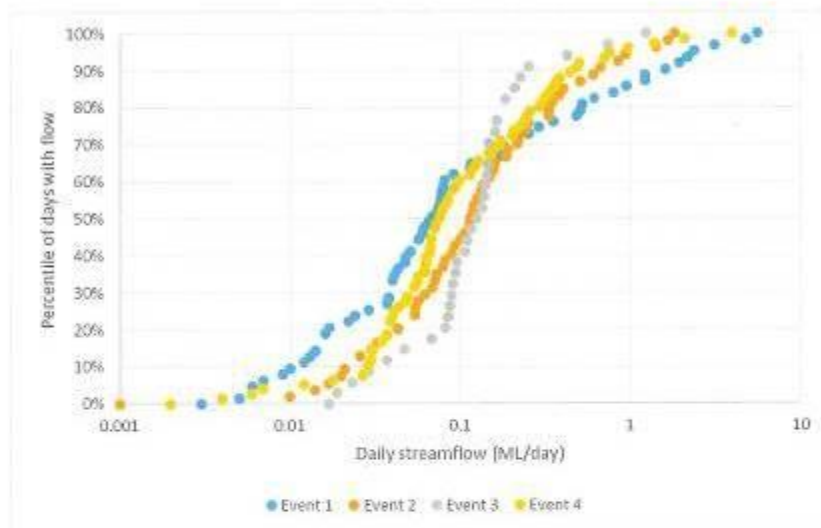


Figure 2 Distribution of daily streamflow in Gap Creek for various recent flow events

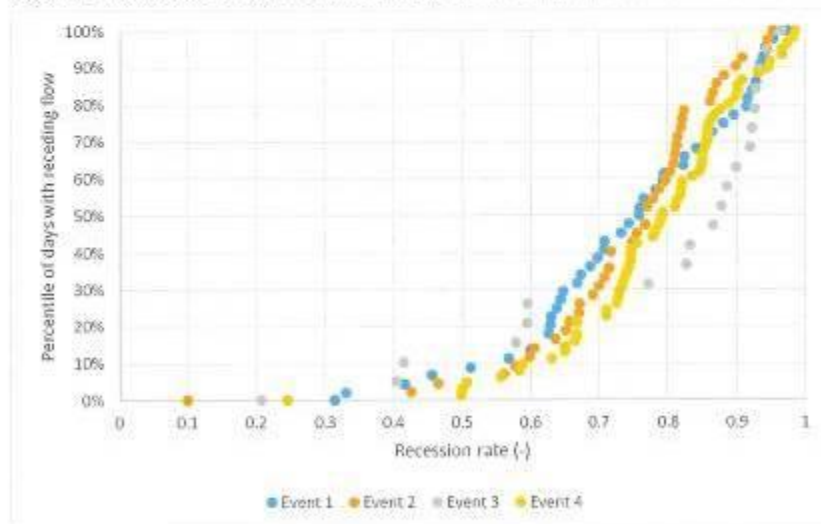


Figure 3 Distribution of observed recession in Gap Creek for various recent flow events

#### **4 Conclusions**

In summary, there is no evidence of change to the hydrology of Gap Creek since October 2013, over which time it is understood that mining activities have begun under parts of Gap Creek catchment that are upstream of the flow gauge. As the catchment of Genowlan Creek is not above any mining activities, it is unlikely that Genowlan Creek has been affected, however direct observations of streamflow in Genowlan Creek would be required to confirm this. Therefore, it is unlikely the flow in Gap Creek or Genowlan Creek have been affected by mining.

It is understood that Airly Mine's surface and groundwater monitoring program is ongoing with the planned installation of more surface and groundwater monitoring equipment to occur in Gap Creek and Mt Genowlan by late 2016. It is recommended that the flow at the Gap Creek gauge continue to be monitored. A preliminary analysis, such as that shown Table 2, would be suitable for site personnel to conduct immediately after flow events to identify potential changes in flow in Gap Creek. This should be accompanied by periodic review as part of the annual water monitoring program.

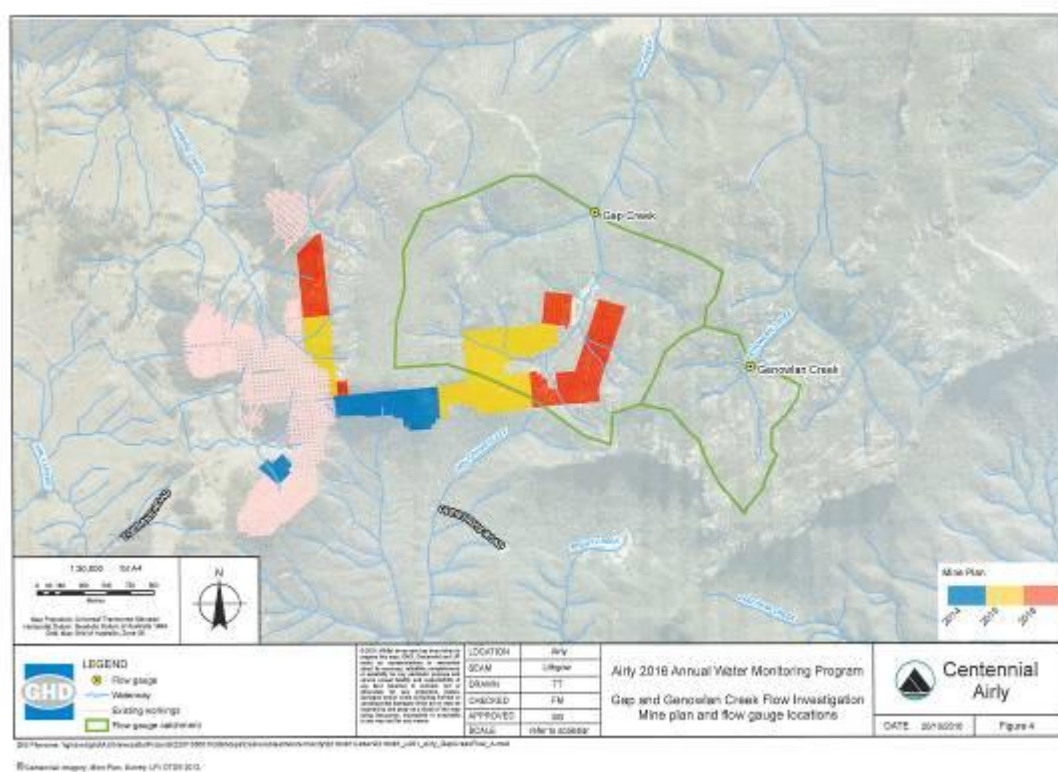
Regards

**Tyler Tinkler**

Water Engineer

0249799061

Attachment: Mine plan and flow gauge locations



## APPENDIX 7

### DEPARTMENT'S RESPONSE TO COMMISSION'S ENQUIRIES



Planning Services  
Resource Assessments and Business Systems  
Contact: Clay Preshaw  
Tel: (02) 9274 6349  
Email: [clay.preshaw@planning.nsw.gov.au](mailto:clay.preshaw@planning.nsw.gov.au)

Mr David McNamara  
Director  
Planning Assessment Commission  
GPO Box 3415  
Sydney NSW 2001

Dear Mr McNamara

#### Airly Mine Extension Project

I refer to the email from David Mooney dated 7 November 2016, concerning the Commission's enquiries on the Airly Mine Extension Project.

##### 1. Framework of conditions

Over many years, the Department has established and refined a comprehensive framework of conditions for underground coal mines. This framework has taken into account the recommendations made by the Commission in previous reviews and other independent experts, including those made by the Panel which undertook the Southern Coalfield Inquiry.

The Department has again applied this comprehensive framework in its recommended conditions for the Airly Mine Extension Project, and has further strengthened the framework by including conditions to establish an Independent Monitoring and Review Panel (IRMP).

The Commission acknowledged the framework in its Review Report, stating that a "*robust set of conditions has been developed in recent years to deal with the inherent uncertainties surrounding underground mining*". Further, the Commission was also "*satisfied that these uncertainties can be managed through a comprehensive framework involving performance criteria, the Extraction Plan process, and the role of the recommended Independent Expert Panel*".

Nevertheless, the Commission has sought clarification on how the framework is proposed to operate under the recommended conditions of development consent, with particular reference to subsidence, groundwater, surface water, biodiversity and the role of the IRMP.

The Department has prepared a simple flowchart of the framework of the conditions (see Attachment A), which summarises the conditions relating to:

1. Mine layout
2. Performance criteria
3. Monitoring and management
4. Compliance
5. Adaptive management.

In particular, the flowchart emphasises the various mechanisms under the conditions of consent where advice from the IRMP (highlighted in red) and expert advice from key Government agencies (highlighted in green) would be required.

## 2. Role and operation of the IRMP

The Department has made a number of changes to the recommended conditions of development consent, which clarify and strengthen the role of the IRMP.

Firstly, while the Applicant would pay all the costs of the IRMP, it would be established by the Secretary, following consultation with the Division of Resources and Energy within the Department of Industry. The Department has prepared a list of suitably qualified, experienced and independent experts and is in a position to appoint the IRMP members in a timely manner following any development consent.

Secondly, the Department would provide administrative support to the IRMP and co-ordinate all requests for advice. This would ensure that the IRMP conducts its work independently without any undue influence from the Applicant.

Thirdly, the IRMP would have an ongoing role throughout the life of the mine in providing independent advice to inform regulatory decision-making by the Department on subsidence-related matters, including the mine layout, performance criteria, monitoring, compliance and adaptive management (see **Attachment A**). The IRMP would also provide advice directly to the Applicant during the preparation of Extraction Plans.

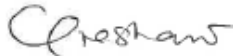
## 3. Risk of Impacts

The Department notes that the relative risk of impacts from the mine are considered to be low given the small scale of mining and the nature of bord and pillar mining. Nevertheless, the Department has adopted a very conservative approach in its recommended conditions for this project in order to address key community concerns.

In particular, the conditions that would regulate surface water, groundwater and biodiversity impacts of the mine are not necessarily proportional to the level of risk of impacts. For example, while there is a negligible risk that mining would affect landholders' water supplies, the Department has included its standard condition requiring compensatory water supply.

Similarly, it is recognised that the mining methods proposed for the project would be unlikely to result in significant levels of subsidence. However, the Department has acknowledged the residual risks involved with developing the mine plan, and recommended the establishment of the IRMP with an ongoing role.

I trust this clarifies these matters for the Commission. If you wish to discuss the matters further, please contact me on 9274 6349.



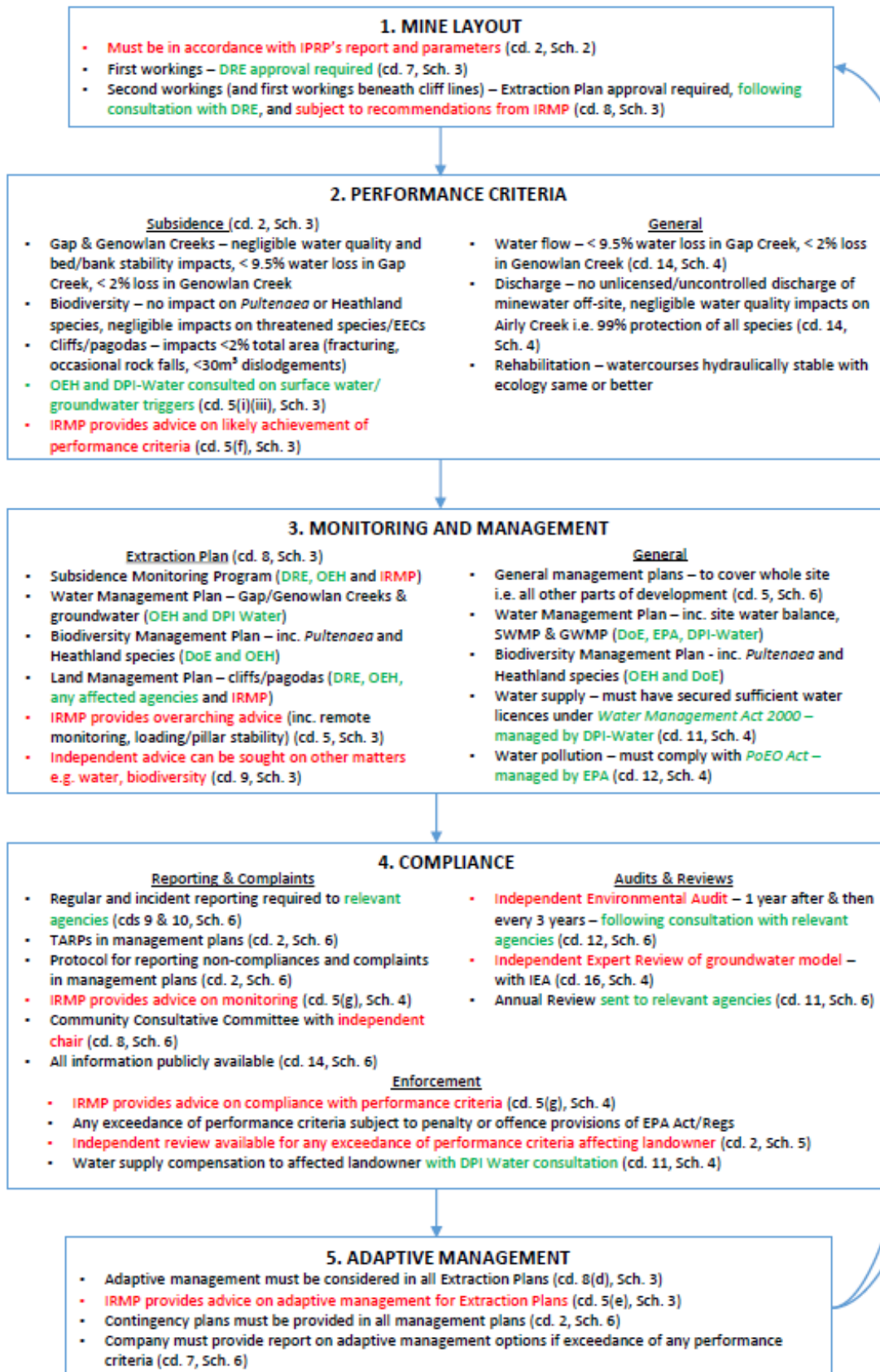
16/11/16

Clay Preshaw

**A/Director**

**Resource Assessments**

Red = independent advice from IRMP or other independent experts  
Green = expert advice from specialist government agency





**APPENDIX 8  
APPLICANT'S MINING TIMELINE**

